

CLAIMS

What is claimed is:

1. A method for controlling congestion in a networking device having a plurality of input interface queues, comprising the steps of:

5 estimating the data arrival rate on each said input interface queue; and

using the estimated data arrival rate on each said input interface queue to determine the sequence in which said input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

10

2. The method according to claim 1, wherein said data arrival rate on each said input interface queue is estimated based on the static link capacity of each said input interface queue.

15 3. The method according to claim 1, wherein said data arrival rate on each said input interface queue is estimated based on a dynamically updated measurement.

4. The method according to claim 1, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on

a constant factor and on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

5 5. The method according to claim 1, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

10 6. The method according to claim 1, wherein said networking device is a router.

7. The method according to claim 2, wherein said networking device is a router.

15 8. The method according to claim 3, wherein said networking device is a router.

9. The method according to claim 4, wherein said networking device is a router.

10. The method according to claim 5, wherein said networking device is a router.

5 11. An apparatus for controlling congestion in a networking device having a plurality of input interface queues, comprising:

means for estimating the data arrival rate on each said input interface queue; and

10 means for using the estimated data arrival rate on each said input interface queue to determine the sequence in which the input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

12. The apparatus according to claim 11, wherein said data arrival rate on each said input interface queue is estimated based on the static link capacity of each said input interface queue.

13. The apparatus according to claim 11, wherein said data arrival rate on each said input interface queue is estimated based on a dynamically updated measurement.

14. The apparatus according to claim 11, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on a constant factor and on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

5

15. The apparatus according to claim 11, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

10

16. The apparatus according to claim 11, wherein said networking device is a router.

17. The apparatus according to claim 12, wherein said networking device is a router.

15

18. The apparatus according to claim 13, wherein said networking device is a router.

19. The apparatus according to claim 14, wherein said networking device is a router.
20. The apparatus according to claim 15, wherein said networking device is a router.
21. An apparatus for controlling congestion in a networking device having a plurality of input interface queues, comprising:
- an input interface queue data arrival rate estimator; and
- scheduling logic for using the output of said input interface queue data arrival rate estimator to determine the sequence in which the input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.
22. The apparatus according to claim 21, wherein said data arrival rate on each said input interface queue is estimated based on the static link capacity of each said input interface queue.

23. The apparatus according to claim 21, wherein said data arrival rate on each said input interface queue is estimated based on a dynamically updated measurement.

5 24. The apparatus according to claim 21, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on a constant factor and on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

10 25. The apparatus according to claim 21, wherein said data arrival rate on each said input interface queue is estimated using an exponential averaging function based on the difference in arrival times between a current data packet and a previous data packet into said input interface queue.

15 26. The apparatus according to claim 21, wherein said networking device is a router.

27. The apparatus according to claim 22, wherein said networking device is a router.

28. The apparatus according to claim 23, wherein said networking device is a router.

5 29. The apparatus according to claim 24, wherein said networking device is a router.

30. The apparatus according to claim 25, wherein said networking device is a router.

10

31. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for controlling congestion in an networking device having a plurality of input interface queues, the method comprising:

15 estimating the data arrival rate on each said input interface queue; and

using the estimated data arrival rate on each said input interface queue to determine the sequence in which the input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

20

32. The method according to claim 1, wherein said step of estimating the data arrival rate on each said input interface queue is performed sequentially with respect to said step of using the estimated data arrival rate on each said input interface queue to determine the sequence in which said input interface queues should be polled and the
5 quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

33. The method according to claim 1, wherein said step of estimating the data arrival rate on each said input interface queue is performed independently with respect to
10 said step of using the estimated data arrival rate on each said input interface queue to determine the sequence in which said input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

34. The apparatus according to claim 11, wherein said means for estimating the data arrival rate on each said input interface queue operates sequentially with respect to said means for using the estimated data arrival rate on each said input interface queue to determine the sequence in which the input interface queues should be polled and the
15 quantity of data to be processed from each said input interface queue each time each said
20 input interface queue is polled.

35. The apparatus according to claim 11, wherein said means for estimating the data arrival rate on each said input interface queue operates independently with

respect to said means for using the estimated data arrival rate on each said input interface queue to determine the sequence in which the input interface queues should be polled and the quantity of data to be processed from each said input interface queue each time each said input interface queue is polled.

5

36. The apparatus according to claim 21, wherein said input interface queue data arrival rate estimator operates sequentially with respect to said scheduling logic.

37. The apparatus according to claim 21, wherein said input interface queue data arrival rate estimator operates independently with respect to said scheduling logic.

10

38. The method according to claim 1, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

15

39. The method according to claim 32, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

20

40. The method according to claim 33, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

41. The apparatus according to claim 11, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

5 42. The apparatus according to claim 34, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

10 43. The apparatus according to claim 35, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

15 44. The apparatus according to claim 21, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

20 45. The apparatus according to claim 36, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

46. The apparatus according to claim 37, wherein the rate at which data are processed from each said input interface queue is proportional to the data arrival rate on each said input interface queue.

add
A3